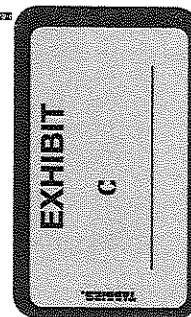


**ELECTRALLOY**

a G. O. CARLSON Inc. Co.

**Nickel-Based High Performance Alloy EC22** (UNS N06022)

**Electralloy's EC22 is a solution strengthened, nickel-chromium-molybdenum high performance alloy providing excellent resistance to pitting, crevice corrosion and stress-corrosion cracking. EC22 also has excellent resistance in both reducing and oxidizing conditions.**

**Chemical Composition (Nominal Analysis, weight percent)**

Carbon ( <i>max.</i> )	0.015	Cobalt ( <i>max.</i> )	2.50
Manganese ( <i>max.</i> )	0.50	Sulfur ( <i>max.</i> )	0.010
Silicon ( <i>max.</i> )	0.08	Tungsten	2.50 / 3.50
Chromium	20.00 / 22.50	Iron	2.00 / 6.00
Molybdenum	12.50 / 14.50	Nickel	Balance
Vanadium ( <i>max.</i> )	0.35	Phosphorus ( <i>max.</i> )	0.020
Copper ( <i>max.</i> )	0.50		

**TYPICAL APPLICATIONS**

The balance of low carbon, nickel, molybdenum, and chromium allows Electralloy's EC22 to be used in a variety of applications. EC22 is used in highly corrosive environments in petrochemical, pulp and paper, oil and gas, marine, and chemical processing industries.

EC22 specifications include the following:

ASTM B472  
ASTM B564  
NACE MR0175

Weld Wire – ANSI / AWS A5.14 / A5.14M – 97 (AWS Classification ERNiCrMo –10)

EC 22 is available in a variety of sizes and forms, including ingot, billet, bar, coil rod, and weld wire.



*The information and data contained in this Product Data sheet are intended for general information and do not constitute any warranty, expressed or implied, of suitability for any applications or design.*

# Nickel-Based High Performance Alloy EC22 (UNS N06022)

## PHYSICAL PROPERTIES

Melting Temperature: 2475°F to 2550°F (1367°C to 1399°C)  
 Density: 0.314 lb./in<sup>3</sup> (8.69 gm/cm<sup>3</sup>)  
 Specific Heat: (@ 126°F) 0.099 Btu/lb./°F  
 Electrical Resistivity: (@ 75°F) 44.8 microhm-in.

### Modulus of Elasticity (E)

Temperature		Tension	
°F	°C	10 <sup>6</sup> psi	10 <sup>3</sup> MPa
70	21	29.9	206
1800	982	21.1	145

### Coefficient of Thermal Expansion

Temperature		
°F	°C	in./in./°F
75 to 200	24 to 94	6.9 x 10 <sup>-6</sup>
75 to 800	24 to 427	7.4 x 10 <sup>-6</sup>
75 to 1600	24 to 870	8.8 x 10 <sup>-6</sup>

### Thermal Conductivity

Temperature		
°F	°C	Btu/ft <sup>2</sup> /ft./hr./°F
118	48	5.8
572	300	9
932	500	12.3

## MECHANICAL PROPERTIES

### Tensile Properties (2050°F / Water Quench)

	UTS (ksi)	.2% YS (ksi)	%EL	%RA	HARD. Rb
ASTM B574	100	45	45		
TYPICAL EC 22	108	53	63	75	86

## HEAT TREATMENT

EC22 can be solution heat treated by heating to between 2025°F and 2100°F (1120°C - 1150°C) and cooled rapidly in water or air.

## HOT WORKING

Recommended hot working temperature range for this alloy is 2200°F down to 1750°F (1205°C to 955°C). The recommended ingot breakdown temperature is 2200°F.

## WELDING

EC22 can be readily welded using conventional methods such as gas tungsten arc (GTAW), gas metal arc (GMAW), and shielded metal arc (SMAW). Various resistance welding methods can also be used. EC22 does not need a post-weld heat treatment to restore corrosion resistance. Oxyacetylene welding should not be used because it causes carbon pick-up with resulting loss of corrosion resistance.

## MACHINING

EC22 can be machined using conventional techniques and equipment similar to those used for 300 series austenitic stainless steels. Since this alloy work hardens, lower speeds are required. Either carbide or high-speed tooling is recommended. Heavy, constant feeds must be maintained to prevent glazing, which causes low tool life and breakage. Water based coolants can be used.

## CORROSION RESISTANCE

Electralloy EC22 exhibits outstanding resistance to crevice corrosion, pitting, and stress-corrosion cracking. This alloy also has excellent resistance to both reducing and oxidizing conditions.

Typical results	CORROSION RATE (mils per year)
ASTM G28 METHOD A	18.96 mpy
ASTM G28 METHOD B	6.55 mpy